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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/658,401	09/10/2003	Toshihiko Nishiyama	KOM-0171/DIV	2248
23353	7590	08/10/2004	EXAMINER	
RADER FISHMAN & GRAUER PLLC LION BUILDING 1233 20TH STREET N.W., SUITE 501 WASHINGTON, DC 20036			NGUYEN, TU MINH	
			ART UNIT	PAPER NUMBER
			3748	

DATE MAILED: 08/10/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/658,401	Applicant(s) NISHIYAMA ET AL.	
	Examiner Tu M. Nguyen	Art Unit 3748	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on 10 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-3, 7-11, 13-15 and 18 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3, 7, 8, 11, 13 and 14 is/are rejected.
- 7) ☒ Claim(s) 9, 10, 15 and 18 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 10 September 2003 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☒ Certified copies of the priority documents have been received in Application No. 10/043,311.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>091003</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. An Applicant's Preliminary Amendment filed on September 10, 2003 has been entered. By this amendment, claims 4-6, 12, 16 and 17 have been canceled; claims 1-3, 7-11, and 13-15 have been amended; and claim 18 has been added. Overall, claims 1-3, 7-11, 13-15 and 18 are pending in the application.

Drawings

2. The drawings are objected to because in Figure 7, fuel supply means (33) described on line 25 of page 23 is not shown. Correction is required.

Specification

3. The abstract of the disclosure is objected to because of the use of legal phrase "means" on line 9. Correction is required. See MPEP § 608.01(b).

4. The disclosure is objected to because of the following informalities:

- Page 2, line 7, --the size of-- should probably inserted following "increase".

- Page 26, line 3, "21" should read --210--. And line 20, --in step 217-- should be inserted following "lean".

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office Action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1-3, 7, 8, 11, 13, and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yanagihara et al. (U.S. Patent 5,826,427) in view of Kato et al. (U.S. Patent 6,134,883) and Okada et al. (U.S. Patent 6,330,880).

Re claims 1 and 7, as illustrated in Figures 1, 4, 5, 9, 11, and 12, Yanagihara et al. disclose an exhaust gas deNOx apparatus for an engine comprising an NOx adsorber catalyst (17) in an exhaust pipe line (16) of an engine (1) for adsorbing NOx when an air fuel ratio of an exhaust gas flowing therein is in a lean state and releasing NOx when the air fuel ratio of the exhaust gas flowing therein is in a rich state (lines 17-40 of column 5), the exhaust gas deNOx apparatus comprising:

- an exhaust gas recirculating circuit (19) for mixing the exhaust gas into intake air; and
- exhaust gas recirculating amount control means (30, 20, 14) for recirculating a predetermined amount of exhaust gas (with an opening G for EGR control valve (20)) through the exhaust gas recirculating circuit for reducing NOx when an adsorbed NOx accumulation amount is not more than a predetermined value, and for recirculating more than the predetermined amount of exhaust gas (with an opening G' for EGR control valve) through the exhaust gas recirculating circuit to bring the air fuel ratio into a rich state when the adsorbed

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NOx accumulation amount exceeds the predetermined value and the NOx is to be released (from Figure 11, when an adsorbed amount of NOx in the catalyst (17) exceeds a predetermined value (step 109 with YES answer), a NOx releasing flag is set and step 111 in Figure 12 is performed. In Figure 12, to bring an engine air-fuel ratio into a rich state, the EGR control valve (20) is made to open larger (step 200) to recirculate a greater amount of exhaust gas than the predetermined amount back to the intake side (11) of the engine (also see Figures 4 and 9));

wherein when the calculated NOx accumulation amount exceeds a predetermined value, the controller outputs a control signal to increase a total opening area of a recirculating circuit adjusting valve (20) to be larger than that in a lean state and makes the air-fuel ratio of the exhaust gas of the engine rich.

Yanagihara et al., however, fail to disclose that an NOx accumulation amount in the NOx adsorber catalyst is based on a NOx amount detection means; and that the exhaust gas recirculating circuit comprises a single exhaust gas recirculating circuit provided with a plurality of recirculating circuit adjusting valves in parallel.

As shown in Figure 6, Kato et al. teach the use of an upstream NOx sensor (41) and a downstream NOx sensor (40) to determine when a NOx adsorbent catalyst (30) is saturated and should be regenerated (lines 48-62 of column 8). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the NOx sensors taught by Kato et al. in the apparatus of Yanagihara et al., since the use thereof would have accurately determined the time the NOx adsorber catalyst is saturated and should be regenerated.

As shown in Figures 3-4, Okada et al. teach an exhaust gas recirculating system comprising a single exhaust gas recirculating circuit (16) provided with a plurality of recirculating circuit adjusting valves (19, 20) in parallel to accurately control the valve opening

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degree (lines 57-67 of column 9). It would have been obvious to one having ordinary skill in the art at the time of the invention was made, to have utilized the adjusting valves (19, 20) taught by Okada et al. in the apparatus of Yanagihara et al., since the use thereof would have provided more accurate control of valve opening degree.

Re claim 2, in the modified apparatus of Yanagihara et al., the exhaust gas recirculating amount control means adjusts an exhaust gas recirculating amount, which is fed when the air-fuel ratio of the exhaust gas flowing into the NO_x adsorber catalyst is brought into a rich state, so that an excess air ratio is more than 1.0 and is about 1.3 or less (as shown in Figures 3-4 and indicated on line 52 of column 3 to line 17 of column 4, an exhaust gas recirculating amount is adjusted so that a target air-fuel ratio is between a lean side and the stoichiometric value to minimize soot generation by the engine).

Re claims 3 and 8, in the modified apparatus of Yanagihara et al., the exhaust gas recirculating amount control means comprises:

- at least an intake air throttle valve (14) free to be opened and closed, which is provided in a pipe line of an intake pipe of the engine, and
- a controller (30), wherein the controller outputs a control signal for decreasing degree of opening of the intake air throttle valve when the air-fuel ratio of the exhaust gas is to be brought into a rich state (see Figures 4 and 9).

Re claims 11 and 13, in the modified apparatus of Yanagihara et al., the exhaust gas recirculating amount control means comprises fuel supply means (30, 4) for supplying fuel into the cylinders of the engine,

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wherein when the air-fuel ratio of the exhaust gas is to be brought into a rich state, the fuel supply means supplies fuel as an adjustment amount to provide an air-fuel ratio that allows the NOx adsorber catalyst to release and reduce NOx.

Re claim 14, in the modified apparatus of Yanagihara et al.,

wherein the exhaust gas recirculating amount control means comprises load detection means (24) for detecting a load of the engine; and a controller, and

wherein the controller inputs a detection signal from the load detection means (24), and when the detected load is a predetermined value or less, it brings the air-fuel ratio of the exhaust gas into a rich state.

Allowable Subject Matter

7. Claims 9, 10, 15, and 18 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Prior Art

8. The IDS (PTO-1449) filed on September 10, 2003 has been considered. An initialized copy is attached hereto.

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure and consists of five patents: Shimizu et al. (U.S. Patent 5,551,408), Deeba et al. (U.S. Patent 6,105,365), Okada et al. (U.S. Patent 6,279,552), Nishiyama et al. (U.S. Patent 6,681,564), and Wright (U.S. Patent 6,697,729), each further disclose a state of the art.

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Communication

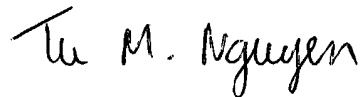
10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Tu Nguyen whose telephone number is (703) 308-2833.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Thomas E. Denion, can be reached on (703) 308-2623. The fax phone number for this group is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-1148.

TMN

August 9, 2004



Tu M. Nguyen

Patent Examiner

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